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# OBSERVATIONS

ON THE

## PHENOMENA OF LIFE AND MIND.

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*(Presented to the Society,  
Jan 1868)*

*(Read in the Department of Anatomy and Physiology, at the Meeting of the  
British Association at Dundee, September, 1867.)*



LONDON:

JOHN CHURCHILL & SONS, NEW BURLINGTON STREET.

MDCCCLXVIII.

LONDON:  
J. E. ADLARD, PRINTER, BARTHOLOMEW CLOSE.

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### PHENOMENA OF LIFE AND MIND.

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LIFE and mind, in their abstract nature or essence alike inscrutable to us, are problems which belong to the same category ; for, in this world, we know nothing of life apart from an organism, and we have no manifestations of mind independently of a brain and nervous system. Here living organisms are required for the display of the vital phenomena, and a brain and nervous system for the manifestations of mind. Life has accordingly been defined as “the collective expression for a series of phenomena which take place *exclusively* in bodies that are organized,” and “mind as the functional manifestations of the living brain.” But then, and at the outset, it is to be remembered that in affirming sensation, emotion, thought, and volition to be functions of the nervous system, what is really maintained is this, that the vesicular matter of the encephalic ganglia furnishes the material conditions—the medium through which these mental phenomena are made manifest in this life. It may indeed be asked, Are not the physical forces of external nature, which underlie all vital phenomena, and the changing states of consciousness which constitute our mental life, as inscrutable to us in their nature or essence as are life and mind ? and it must be conceded that they are. Matter and force are coexistent, and are correlative. Nor can we conceive of the one but in association with, by, and through the other, any more than we can conceive of life, in our present state of existence, apart from an organism, or of thought independently of a living brain.

Mr. Grove has indeed most convincingly shown that the correlations of the physical forces, the convertibility of one form of force into another, points to a *unity* of force; nay, more, leads, as he thinks, to the belief that "*the two fundamental conceptions of matter and motion will be found sufficient to explain physical phenomena*"\*. The agency of motion in the manifestations of both life and mind is unquestionably important, and strikingly conspicuous, so that motion has been regarded as a kind of common ground upon which nature, life, and mind may be said to meet. In every living organism there are ceaseless motion and change, and the dynamical agency of mind in the production of motion is seen in all our voluntary movements and volitional acts. Whatever, indeed, may be the notion entertained as to the abstract nature of mind, *mobility* and *sensibility* are its primordial points of contact with the external world or nature. But still the phenomena of life and mind are so antagonistic to, that they are not to be identified or confounded with, nor can they be included under, mere physical phenomena: for, while matter and the physical forces suffice for the explanation of the physical phenomena of nature, to these require to be superadded a *living organism*—*germinal matter with its vital force*, for the display of the phenomena of life,—and to these, again, the further presence of a nervous system, and the vesicular matter of the encephalic ganglia, with their inherent nervous and mental forces, for the manifestations of *sensibility*, *intelligence*, and *thought*. The fact, indeed, cannot be denied, that the agency or co-operation of matter and the physical forces is as essential to the manifestations of life as life itself is to the display of the mental phenomena, of which consciousness is the exponent, so that physical, vital, and mental phenomena have been considered, and may perhaps be most correctly regarded as the expression of successive and ascending developments of *force*, each *sui generis*; for they are not to be confounded, and cannot be identified with each other.† The spontaneity of the actions of the living organism, and its vital force,—its self-constructing, self-maintaining, and self-propagating power,—cannot be identified with, for

\* *Vide* Address of W. R. Grove, Esq., Q.C., M.A., F.R.S., President of the Meeting of the British Association, at Nottingham, 1866.

† I am aware that the existence of a distinct vital force has been and is ignored by some distinguished physicists. Grant, say they, a *living organism*, and then the agency of the physical forces is all-sufficient for the display of the vital phenomena, heat playing an all-important part in their production. But, waiving this, I would here briefly remark, that the correlations of the vital, nervous, and mental forces present to the psychological inquirer and thoughtful practitioner a subject fraught with deep interest and importance, seeing that vital power supplies nervous energy, and the nervous force mental activity. The transformation of these three forces—the vital into the nervous, and the nervous into the mental, and their converse—thus interchanging and interchangeable, with their attendant consequences, the expenditure of the one supplying new energy and vigour to the other, opens out an interesting field for observation and inquiry, and clearly points out how impossible is the attempt to isolate mental facts from all those of the nervous and vital

it is totally distinct and different from, any ordinary physical force—compelling, as it does, the elements to take up their required special relations, and thus drawing a broad line of demarcation between the simplest living organisms and the most perfect mechanism of human construction.

Again, as Professor Beale has justly remarked :

“Let no one conclude that anything is gained by regarding nerve force as electricity or some mysterious unknown correlative of ordinary force, of the nature of which we know nothing. If we admit it to be ordinary electricity, the problem is not solved; for it is obvious that its manifestations are due entirely to the peculiar arrangement of the nerve-cells and fibres which constitute the mechanism for setting free and conducting the currents. It is not possible to conceive nerve phenomena without a special nervous apparatus, and it would be absurd to ignore this apparatus in considering the nature of nervous action. The action of the machine cannot be dissociated from its construction. But the construction of the apparatus and its maintenance in a state fit for action are due to *vital power*. The lowest, simplest, and least varied kinds of nervous action, like all other actions known in connection with the living elementary parts of living beings, are intimately connected with *vital* changes, and cannot be accounted for by physical and chemical laws only. When we ascend to the consideration of the higher and more complex nervous actions, we find reasons for concluding that the vital acts perform a still more important part. In the brain of man we have probably the only example of a mechanism possessing within itself not only the means of repair, but the capacity for improvement and the power of increasing the perfection of its mechanism, not only up to the time when the body arrives at maturity, but long after this, and even in advanced life, when many of the lower tissues have undergone serious deterioration, and have long passed the period of their highest functional activity.”\*

“Life,” † he has well observed in his able exposition of the subject, founded upon microscopical investigation, “is a state of action and of change. Within every living organism, and every elementary part or cell, are ceaseless motion and change. The absorption of new lifeless material, its conversion into living matter, and the

system with which they are so closely interwoven. At the same time, while we note the perpetually-recurring metamorphosis of *nerve-force* into *mind-force*, and of *mind-force* into *nerve-force*, we know it to be a physiological fact that the vesicular matter of the cerebrum is the material substratum through which the metamorphosis is effected; and, indeed, have we not actual proof of *increased disintegration* of the nervous tissue in the redundant amount of the *alkaline phosphates* in the urine when the centre of intellectual action has been overtaxed?

\* *Vide* ‘How to Work with the Microscope,’ 4th edition. Churehill, p. 338.

† *Vide* ‘Introduction to the Physiological Anatomy and Physiology of Man,’ by Lionel Beale, M.D. Longmans and Co., 1866.



removal of that which has ceased to live, *comprise* a continuous succession of actions, in which *organization* and *disorganization*, *life* and *death*, are unceasing." He justly adds, "But in these actions are comprised phenomena of two distinct classes, different in their very nature—*physical phenomena* and *vital phenomena*—physical phenomena which occur in the external world, and phenomena truly vital, the nature of which is not to be so explained,—such are the processes of formation, growth, and multiplication, and occur in living beings only,—whereas the development of heat, light, electricity, and such like, are *physical phenomena*, whether they occur in living organisms or in inanimate matter.

The *living germinal matter alone* is the seat of vital actions, while in the *lifeless formed material* physical and chemical phenomena are in operation."\* Now, life in its mysterious association with matter is transmitted from one living being to another. Every living particle comes from a pre-existing living particle, for in every instance *matter* derives its vital power or properties from a previously existing organism. The vital part of the impregnated egg consists of living matter, which results from living matter belonging to the organisms of the beings that produced it. It manifests a life independent of its parents, and undergoes development if the requisite physical conditions are supplied.

But, on the other hand, "every attempt," to use the words of Dr. Beale, "to give *vitality* by means of the physical forces to inanimate matter has been vain and futile. Not the slightest approach, by any means, has been made towards the formation of anything having the properties of the lowest and simplest form of living matter. All attempts by synthesis at the formation of albumen or fibrine, nay, even of starch or the cellulose of the very lowest vegetable organisms, have been unsuccessful."

"How beautiful," as observed by Todd and Bowman, "is the provision which this power, possessed by organized bodies of generating others, affords for preserving a perpetual succession of living beings over the globe. The command, "*increase and multiply*," has never ceased to be fulfilled from the moment it was uttered. Every hour, every minute, brings into *being* countless myriads of plants and animals, to supply in lavish profusion the *havoc* which death is continually making; and it is impossible to suppose that the earth can cease to be in this way replenished until the same Almighty Power that gave the command shall see fit to oppose some obstacle to its fulfilment."†

*Mental Phenomena.*—Turning now to the consideration of the

\* 'Physiological Anatomy of Man.'

† Ibid.

mental phenomena, of which consciousness is the exponent,—and here, let me say, I confine my observations to such mental phenomena,—I would begin by observing that in *limine* it may literally be said that from the first moment the primordial cell-germ of a human organism comes into being, and is launched upon the ocean of time and space, the entire individual is present,—an organized entity exists, fitted for a human destiny; and that from the same moment, *matter, life and mind*, body and soul, are never for an instant separated, their union constituting the essential mode of our present existence. The mind, like the body, passes through its phases of development and growth. The germs, so to speak, of all our activities—sensational, emotional, ideational, and intellectual—as constituent elements, are present from the first. They exist *implicitly, ab initio*, in every *mens sana*, and they are all in due order and succession evolved *explicitly* as the different phases of consciousness become developed: for in the primordial cell of a human organism are potentially contained the vital, nervous, and mental forces. Inherent in it are the powers of nutrition, development, and growth, under which, in utero, daily supplied with the nutrient pabulum, the bodily fabric is evolved and built up in accordance with all the subsequent wants of the future man. Not only the osseous, muscular, and vascular systems, but the nervous apparatus also, upon the vesicular matter of the encephalic ganglia of which, the mind is dependent for the manifestation of all its phenomena throughout the totality of life in health and disease. As soon, however, as embryonic life is passed, and an independent existence, an individuality is established, the nascent consciousness becomes awakened, roused into activity by stimulus from without, the infant mind responding at birth solely to impressions from without or to instinctive feelings from within, sensibility and mobility being its primordial points of contact with the external world. This nascent consciousness, purely sensational at first, emerges gradually, step by step, from self-consciousness to world-consciousness, and through the ideational and emotional, up to its highest phase of intellectual development. Thus, our *outer* life begins with consciousness, and, it may be said, with consciousness to end; for, on the cessation of consciousness, life, reduced to a series of mere automatic movements speedily becomes extinct. Consciousness itself, as *the exponent of mind*, is an ultimate fact in animal life, beyond which we cannot penetrate. It implies *mental existence*, and is the universal condition of intelligence, for it is involved in every sensation which we experience, in every mental act that we perform, in feeling, perceiving, thinking, and willing. In a word, it is *individuation*, and equivalent to the knowledge which we possess of our own personal identity. It is like life, one and indivisible, for the unity of consciousness is the deepest and most indisputable

fact of our nature ; and to feel, to perceive, to think, and to will, are so many acts or states of consciousness ; thus the mind works in a succession of states. Two thoughts or acts of memory, however closely related to one another, cannot be presumed to exist *at the same instant* in our consciousness, each has its own individuality in *time*. Swiftmess of succession naturally suggests *unity* of time and state, which has no real existence, for the mind cannot maintain two impressions *simultaneously*. We can indeed best conceive of consciousness in relation to time as an incalculably rapid succession of acts or states from the moment of birth, and as passing through a series of developments. These progressive phases of mental development are dependent for their very existence upon the evolution and material condition of the vesicular matter of the encephalic ganglia through which they are manifested ; for *comparative psychology*, the study and strict interpretation “ of the living experiments,” to use the happy and expressive language of the illustrious Cuvier, “ which nature has presented to us in an ascending series, in the varying forms of animal existence, from the lowest up to man,” not only establishes the fact that sensation, perception, emotion, and intellectual action are distinct states of consciousness successively developed, but that these states are manifested through different portions, or nervous centres of the encephalon, and that the human mind in its progress to maturity passes through these successive phases of development. Self-consciousness, as the earliest, and consequently the lowest, is the primary condition of intelligence, and psychology has been briefly but aptly defined *developed consciousness*.

In our mental development there are *three* distinct phases of consciousness successively evolved, and characterised by different psychological phenomena :—1. The sensational ; 2. The perceptive, or ideational and emotional ; and, 3. The intellectual. For we feel, before we can perceive or idealise, and long ere we can either reason or reflect, we manifest the animal instincts and the social propensities, affections, and feelings. And thus to feel, to perceive, or idealise, and to think,—in other words, *sensation*, *ideation*, and *intellection*,—are different and distinct acts or states of consciousness. And under these three phases all mental phenomena of which consciousness is the exponent are comprised, and may be classified and grouped. And 1st. *The phenomena which formulate the sensational consciousness* are, besides the intuitions of the special senses, *sensori-motor*, consensual, and instinctive actions and feelings. And among these, common sensibility or feeling, and the capability of receiving pleasure and pain from mere tactile impressions are primordial, the most universal in nature, and the most essential to human existence. Sensation is the link in the chain of being between the vital and the mental forces, connecting together the conscious and the unconscious processes. As a complex act, it is



partly within and partly without the consciousness; but, as soon as embryonic life is passed, it traverses the line which separates the physical and vital from the nervous and mental processes, enters the light of consciousness, and thus becomes a fact, psychological as well as physiological.

Man is at birth the mere creature of sensation and instinct. All his actions are automatic, reflex, and consensual; his intelligence is purely sensational; his feelings simply those of pleasure and pain; and his impulses to action innate and instinctive. But, though the lowest in the psychical scale, these sensori-motor, consensual, and instinctive phenomena are not to be confounded with, for they are altogether independent of, intelligent and volitional actions.

The sad and melancholy spectacle, indeed, has but too often been presented to us in instances in adult life, where the functions of the cerebrum having been arrested and suspended, of man reduced to his primitive condition of mere sensational and instinctive being. Now, it is in such cases where the cerebrum is benumbed and paralysed, and is no longer capable of receiving and acting upon sensorial impressions, that the sensory ganglia become so strikingly manifest as an independent centre of action.\*

The nervous apparatus of the sensational consciousness of man consists, to the *exclusion of the cerebrum*, of the spinal axis and nerves, the medulla oblongata, and the chain of sensory ganglia, including those of the special senses at its summit. These form a distinct centre of action independent of, and not to be confounded with, that of the ideational or intellectual consciousness.

2ndly. *The Phenomena of the Perceptive or Ideational and Emotional Consciousness.*—In Perception, as the correlative of Sensation, and indicative of its intellectual phase, *ideas* are formed—sensory impressions are *idealised*, that is, translated or converted into intellectual phenomena, and become the materials of thought. In this stage of our mental development, to the sensational the Perceptive Phenomena are superadded: these are *Ideation* and *Volition*, with their associates *Memory* and *Emotional sensibility*. The genesis of the *will* and of the *memory* is in the ideational consciousness; for their manifestation is dependent upon the presence of *ideas* on the mind. There can indeed be no *volitional* or *determinate action*, any

\* For a strikingly illustrative instance of this kind, I would refer to a case, which I published, with a commentary on its psychological bearings, in 1855, in the 'British Medical Association Journal.' The case was one of suspension of the mental faculties, of the power of speech, and of the special senses, with the exception of sight and touch, continuing for many months; and it has been characterised by Dr. Carpenter, in his 'Human Physiology,' as the most valuable example as yet put upon record in illustrating the nature of a purely *sensorial* and *instinctive*, as distinguished from an *intelligent* existence, and the gradual nature of the transition from the one to the other."

more than there can be any exhibition whatever of the power or faculty of *Memory*, without the existence and retention of ideas in the mind, and hence *Ideation*, *Memory*, and *Volition* are interwoven with each other, and are one at the root. When, indeed, the perceptive consciousness is in abeyance, they are one and all suspended. There is an end "to all the enjoyments of the feast, all the fragrance of the flowers; and the whole of the associations which they embody vanish as with a single and magic stroke."—*Morell's Psychology*.

But the perceptive consciousness is not limited in the sphere of its action to the mere ideation of external existences, their sensible qualities, and physical attributes. It has a far more extended range; for, excepting the sensational intuitions, all our immediate or intuitive knowledge, of whatever kind, has its origin in perceptive experience. All the ideational activities appertaining to man as an individual, emotional and social, as well as a moral and religious being, are duly evolved and brought into play as the perceptive, or emotional consciousness, becomes developed.

As sensation is the link in the chain of being between the conscious and the unconscious processes, the vital and the mental forces, so is ideation intermediate between sensation and intellection,—the lowest and the highest phases of our mental development.

The great hemispherical ganglia—the acknowledged seat of all intellectual action and volitional power, together with the centres of emotional sensibility in the meso-cephale—constitute the nervous apparatus of the ideational consciousness. For, wherever these hemispheres exist, and in however rudimentary a state of development, there we invariably find unmistakeable evidence of the manifestation of the essential phenomena of the perceptive consciousness—Ideation, Memory, and Volition, as opposed to the mere sensorimotor, consensual and instinctive actions, the phenomena of the sensational consciousness.

These crowning ganglia are manifestly superimposed on the sensory, emotional, and motor centres within the encephalon, and in close and direct commissural connection with them, for the purpose of combining and associating instinctive actions and emotional sensibilities with ideational activities, and for offices and purposes the noblest and most exalted of which the human mind is capable.

3rdly. *The Phenomena of the Intellectual Consciousness*.—The sensory intuitions of the sensational consciousness, when transmitted to the cerebrum, are there *idealised*, by a second ganglionic action, and become transformed and converted into intellectual phenomena. And though to *perceive* and to *think* are distinct mental acts, *ideation* and *intellection* are inseparably connected, for the perceptive intuitions furnish the materials of thought; and although without ideas there could be no *thinking*, still an intuitive reasoning

process underlies nearly the whole of our mental operations,—for, no sooner is the perceptive consciousness sufficiently developed, and the mind able to perceive and to look upon objects which are in striking contrast with each other, than it intuitively begins to compare them, and every act of comparison involves, in the result, the agency of the cogitative or reasoning faculties. Now, *perception* speaks to us from *without*, but *intellection* from *within*, so that the two mental processes are reversed. And while on the one hand all our immediate or intuitive knowledge has its origin in perceptive experience; so, on the other hand, all our representative knowledge is the *creation* or *product* of the mind's own intellection and introspection—of imitation, imagination, ratiocination, and reflection; for these, with memory and volition, are the distinguishing phenomena of the intellectual consciousness. It is through them that man is raised so immeasurably high in the scale of being, and that the human mind attains to its culminating phase of development in the *highest reason* and the *freest will*.

Rising above sensation and above perception, man soars into the region of representative knowledge, grasping, through his intellectual faculties, his reasoning and reflecting powers, *abstract ideas*, and *necessary* and *universal truths*, and finding articulate *utterance and expression* for them, through the noble faculty of speech, in language.

The great hemispherical, as the crowning ganglia of the encephalon, are, as I have said, superimposed on the sensory, emotional, and motor ganglia, for offices and purposes the noblest and most exalted. All physiological psychologists are agreed that they are the sole and exclusive seat of all intellectual action and volitional power—of the understanding and the will. But they obviously subserve different kinds of mental action. For, as Mr. Herbert Spencer has well observed: "Localization of function is the law of all organization whatever, separateness of duty is universally accompanied with separateness of structure, and it would be marvellous were an exception to this to exist in the cerebral hemispheres.

"Let it be granted that the cerebral hemispheres are the seat of the higher psychical activities; let it be granted that among these higher psychical activities there are distinctions of kind which, though not definite, are yet practically recognisable; and it cannot be denied, without going in direct opposition to established physiological principles, that these more or less different kinds of psychical activity must be carried on, in more or less distinct parts of the cerebral hemispheres. To question this, is not only to ignore the truths of physiology as a whole, but especially those of the physiology of the nervous system. Now, there is either some arrangement, some organization, in the cerebrum, or there is none. If there is no organization, the cerebrum is a chaotic mass of fibres,



incapable of performing any orderly action. If there be some organization, it must consist in that same physiological division of labour, in which all organization consists; and there can be no division of labour, physiological or other, of which we have any example, or can form any conception, but what involves the concentration of *special kinds of activity in special places.*”\*

Of this cogent reasoning of Mr. Herbert Spencer, Dr. Richardson, in his recently published lecture, in the ‘Medical Times and Gazette,’ “On the Local Independency of Nervous Function,” presents us with a marked confirmation:

“Than the perfection of the *isolation* of the nervous centres,” says Dr. Richardson, appealing to his experiments on the temporary local destruction of nervous function by the application of extreme cold, “*no fact is more striking.* The brain structure is one of the most indifferent conductors of caloric with which we can become acquainted. It can receive the *force* and hold it, but it conveys it badly. If the force of the nervous system could pass readily and immediately from one part to an adjoining part by *conduction*, *individuality* of function would be impossible. There would be but one organ, not, as there is, a series of organs linked together in structure, but *isolated* in regard to *speciality* of function. The *indifference* of *conduction* practically secures individuality of action with continuity of structure so excellently, that we can fully destroy, by the direct and limited action of extreme cold, the function of a single centre, without involving any other. It appears to us as though the brain were made up of portions of the same matter all united into one organism, but distinctly mapped out into insular divisions, each well separated from its neighbour, and having its own duties. It is like a continent, divided into so many nations, all united by soil and air and other bases of existence, but yet each exercising a special function in regard to the continent at large, each having its own language, its own genius, its own laws.” “The only mode,” he says, “in which I can account for this separation and localization of power, is by the vascular supply of the nervous system, and by the bad conducting power of the nerve matter. As each centre is supplied with its own vessels, through which alone it derives its force, and as each centre possesses the power of retaining force, there is set up an independence of organism in every part sufficiently perfect, I think, to secure *isolation* of function with unity of construction.” At all events we have the fact, that each *nerve centre* is practically an independent *centre of force*.

But it must be borne in mind that Dr. Richardson, on the local independency of nervous functions, refers especially to *physical facts*, and not to the *psychological arguments*, which the illustrious Gall

\* Spencer’s ‘Principles of Psychology,’ p. 607, 1855.



instituted, in regard to the *isolation* and development of the *organs* of the *mind*. He says truly, "In experiments on the inferior animals with extreme cold, it is only possible to observe the destruction of those functions which come under the direct observation of the senses; symptoms which are motor in character, and which cannot be traced back to any voluntary—that is to say, any purely *volitional*—act of the subject." "But at the same time," he remarks, "it would be unjust not to allude to the circumstance that, by the process of analogical reasoning, the argument of Gall is powerfully strengthened. For, if each portion of the nervous system which governs motion is an independent local centre of power, it is a fair inference that each portion of the nervous system governing the mental acts is also an independent centre of *power*, since it is not probable there would be two methods for the reception of *force* in one series of organic structure—a structure which, whether presenting itself as *grey* or as *white matter*, possesses the same physical characteristics in respect to the conduction of force."—*Medical Times and Gazette*, August 17th, 1867.

Now, that different parts or portions of the great sheet of vesicular matter which crowns the convoluted surface of the cerebral hemispheres subserve, and are the seat of, different and special psychical activities, is to my mind a well-established fact. The microscopic investigation of its ultimate structure in the three main divisions—the anterior, middle, and posterior lobes of the cerebrum, by my friends, Professor Beale and Dr. Lockhart Clarke, revealing as it does to us, *distinguishable differences and varying degrees of complexity*, warrants, as I think, the inference of diversity of office. Moreover, as complexity of function is necessarily connected with complexity of structure, and as it is in the ultimate structure of the vesicular matter of the anterior lobes, that the greatest complexity of nerve-cells, nerve-fibres, and circuits are demonstrable, does it not necessarily follow, as a legitimate deduction, that the grey matter of the anterior lobes is the seat of the highest and most complex of our psychical activities?

In conclusion, let me avow what are my own views and convictions as to the offices or psychical activities of which the vesicular matter is the seat in the three main divisions of the cerebrum, its anterior or *frontal*, middle or *parietal*, and posterior or *occipital regions*, the boundary lines of which may be considered to be broadly marked out and defined by the coronal suture before, and the lambdoidal behind. These convictions have not been hastily formed, and although they are in general accordance with, they are not founded upon, the multiplied cranioscopical observations of Gall, Spurzheim, Combe, and Carus,\* but upon the facts of pathology observed by myself, or

\* In a paper read before the Royal Medical and Chirurgical Society, June 25th, 1850, and published in the 'Lancet,' October 22nd and November 2nd, of the

recorded by others, and upon those of developmental anatomy, comparative and human, viz. that the anterior lobes of the brain are the seat of the intellectual, the middle of the personal or individual, and

same year, "*On a Case of Hemiplegia with Cerebral Softening, in which loss of Speech was a prominent symptom.*" I took occasion to observe that "the psychological phenomena of disease present a wide and an interesting field for observation and inquiry; and that it is greatly to be regretted the subject has not more generally engaged the attention of those distinguished men to whom we are so much indebted for their valuable researches on the pathology of the brain." I rejoice in the relief that there now exists less cause for the expression of such regret, as *cerebral physiology*, by the pathologist, is no longer unheeded or neglected. I have great pleasure in referring to the valuable contributions of Dr. Samuel Wilks, "*On the Pathology of Nervous Disease,*" in the last published part of 'Guy's Hospital Reports,' and to the researches of Dr. Hughlings Jackson, Dr. Ogle, Dr. Broadbent, Dr. Richardson, and others. Dr. Wilks says truly, "the discovery of the connection between particular symptoms and definite nervous lesions, is of the utmost importance in a clinical sense, and of the extremest interest from a physiological point of view." And, again, "the medical man, whilst treating the diseases of the brain, has very often at the same time to deal with the various operations of the mind, which are intimately associated with it. Indeed, should he really investigate with full interest the various examples of brain disease which come before him, he can scarcely avoid being psychologist as well as physician; and I venture to affirm that already, by regarding mental operations in their physiological and medical aspect, the true explanation has been given to many of the obscure phenomena of the mind. Pure metaphysics appear to be becoming a subject of the past, and it is now seen that those who engage themselves in the study of psychology are fain to employ the true inductive method, and to derive these conclusions from observation and experience in the same way as in every other branch of positive science. Thus it is that the more advanced opinions of the later metaphysicians have tended in the same direction as those of the psychologists, and the psychologists are now compelled to study mental operations as observed in their fellow-men, and no longer wrap themselves up in their own self-consciousness, and evolve every conclusion from the inner self. It would be absurd for the metaphysician to adopt his own method, and arrive at different results from the anatomist and the physician who are studying the physiology of the brain in health and disease. The psychologist can no longer ignore the fact that the brain is the material organ of the mind, and that he must study its nature and its operations, under the most varied circumstances, before he can establish a true mental philosophy." ('Guy's Hospital Reports,' 3rd series, vol. xii, p. 158. Churchill and Sons, 1866.)

In closing this note, I would here reiterate what I have myself elsewhere said: "The attempt to trace the connection between structural diseases of particular portions of the substance of the brain, and deranged, impaired, or obliterated manifestation of the mind, however it may be beset with almost insuperable difficulties, is, nevertheless, one of vast interest and great importance; and, to this end, I cannot suppress my conviction that it is an incumbent duty upon the medical practitioner to make himself thoroughly acquainted with the principles and facts of phrenology, and with the respective sites or localities of the different organs in the cerebral convolutions; and to let no opportunity slip of bringing phrenological doctrines to the test of experience; for, if I am not greatly mistaken, it is to post-mortem examinations of the brain, and to pathological investigations, more than to any other source, that we are to look, not for the discovery of normal functions, but for evidence in support or refutation of the dogmata of phrenology." (*Ide* 'Medical Psychology,' p. 62. Churchill and Sons, 1863.) To all who are interested in such inquiries and in cerebral physiology, I cannot too strongly recommend Dr. Turner's Lecture on the Topography of the Brain. ('The Convolutions of the Human Cerebrum Topographically Considered,' by W. Turner, M.B. Lond., F.R.S.E. London, R. Hardwick.)

the posterior of the social and affectional activities or attributes of the human mind. In other words, my mind rests on the conviction—as I have elsewhere said, in a former paper, “*On the Influence of Civilisation upon the Development of the Brain among the different Races of Man*,” which I read at the Birmingham meeting of this great association in 1865—that the anterior are the intellectual lobes of the brain, the seat of the intellectual faculties, the reasoning and reflecting powers; the middle lobes are the personal, the seat of the animal activities, of the individual or personal affections or attributes, and of the moral and religious intuitions of the mind; and that in the posterior lobes are seated the social and affectional activities and propensities, those endearing attributes which are the charm of our existence here, binding together in the bonds of affection the ties of friendship, of country, and of race. Moreover, I recognise, with Gratiolet and Vogt, three stages or planes of development throughout the hemispheres of the brain, and in their tripartite division into anterior, middle, and posterior lobes: 1. The inferior, or lowest, the *basilar and superciliary*; 2. The middle, or *medial frontal*; and 3, the highest,—the coronal, or *superior frontal*, the sole and exclusive prerogative of man. Nor do I hesitate to avow my belief that it is on the comparative evolution and relative size of the different cerebral lobes on these stages or planes of development that the individual character is mainly dependent, and that while the middle or personal are the dominating lobes of the brain, as to the animal, moral, and religious activities of the man, it is the anterior which indicate the character of his intellectual bearing, and the posterior that of his social tendencies, propensities, and affections.

